FIG. 1

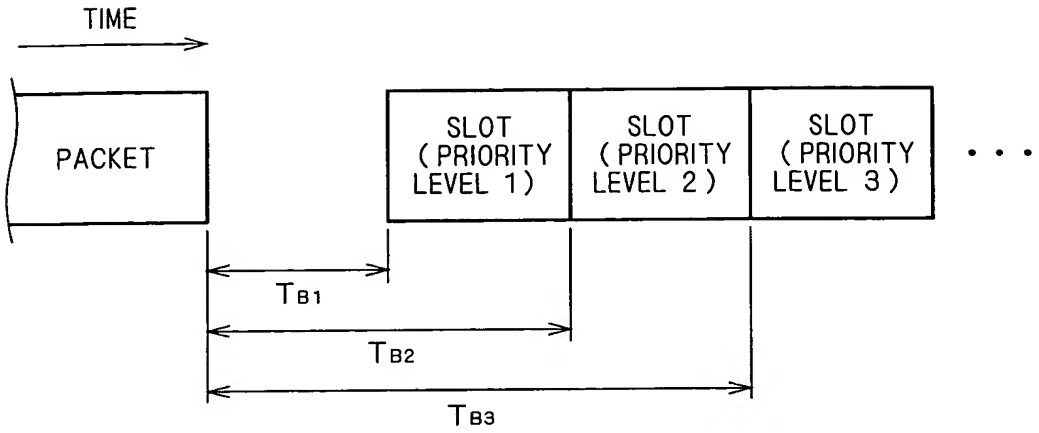


FIG. 2

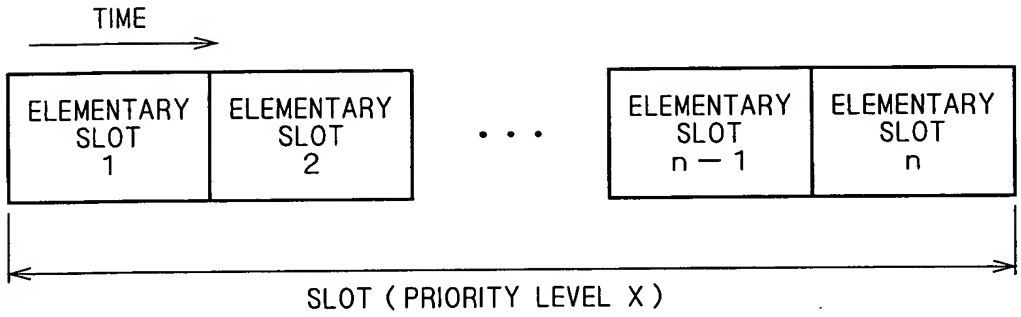


FIG. 3

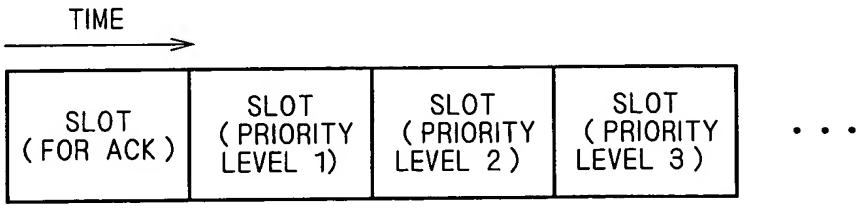


FIG. 4

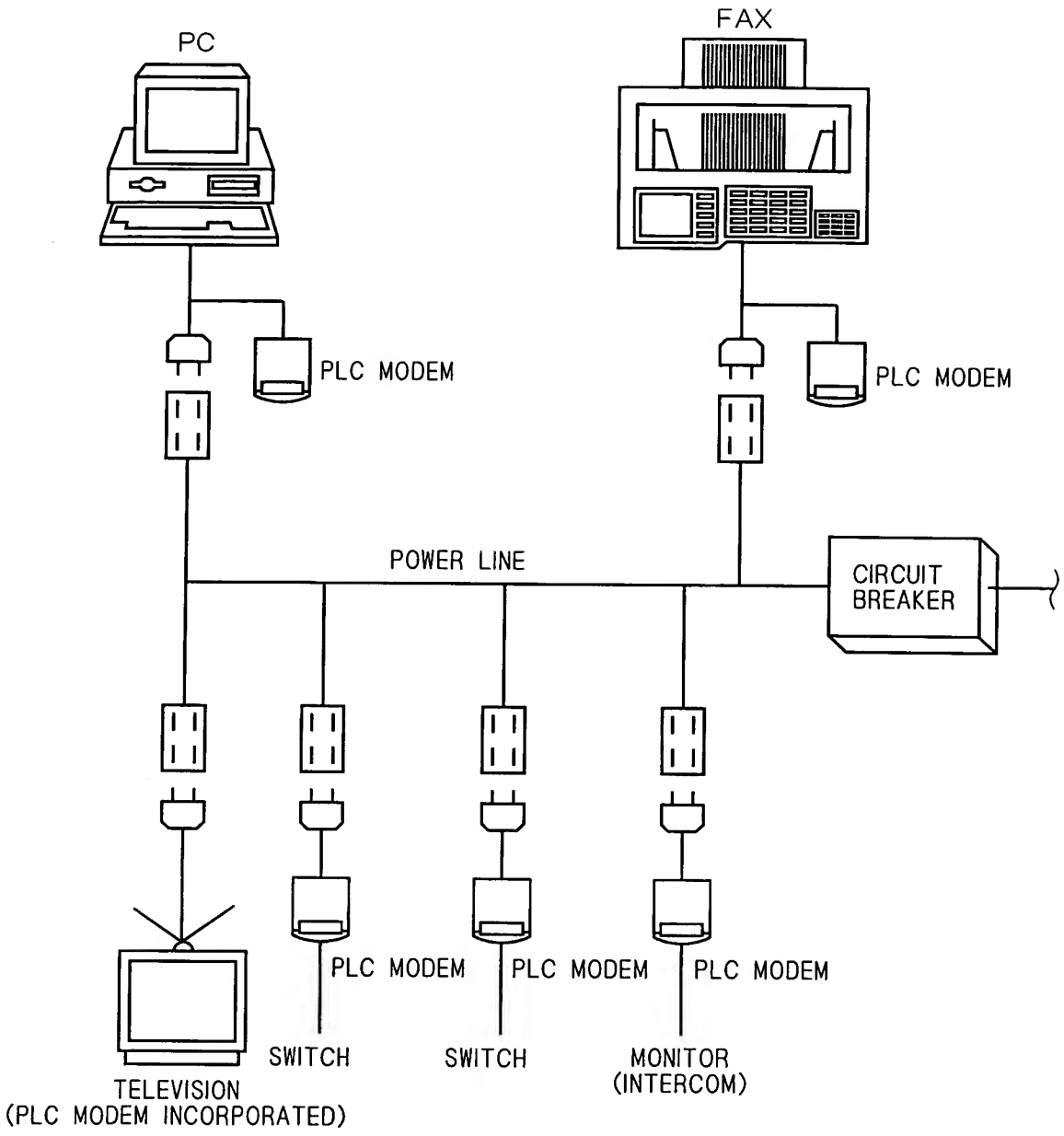

PC
FAX
PLC MODEM
PLC MODEM
POWER LINE
CIRCUIT BREAKER
PLC MODEM
PLC MODEM
PLC MODEM
SWITCH
SWITCH
MONITOR (INTERCOM)
TELEVISION (PLC MODEM INCORPORATED)

FIG. 5A

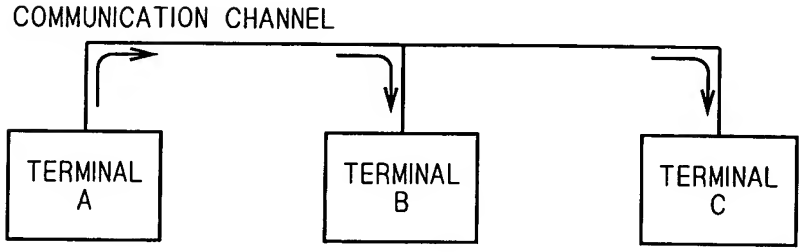

COMMUNICATION CHANNEL
TERMINAL A
TERMINAL B
TERMINAL C

FIG. 5B

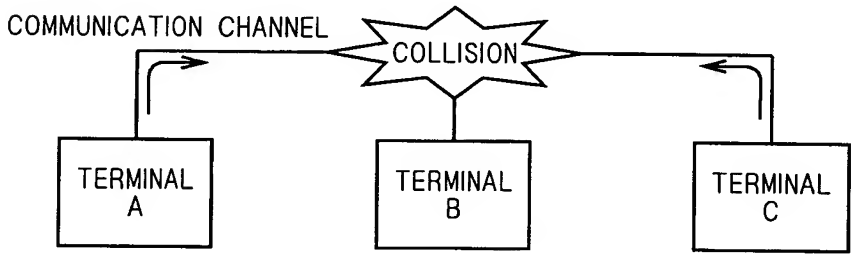

COMMUNICATION CHANNEL
COLLISION
TERMINAL A
TERMINAL B
TERMINAL C

FIG. 6

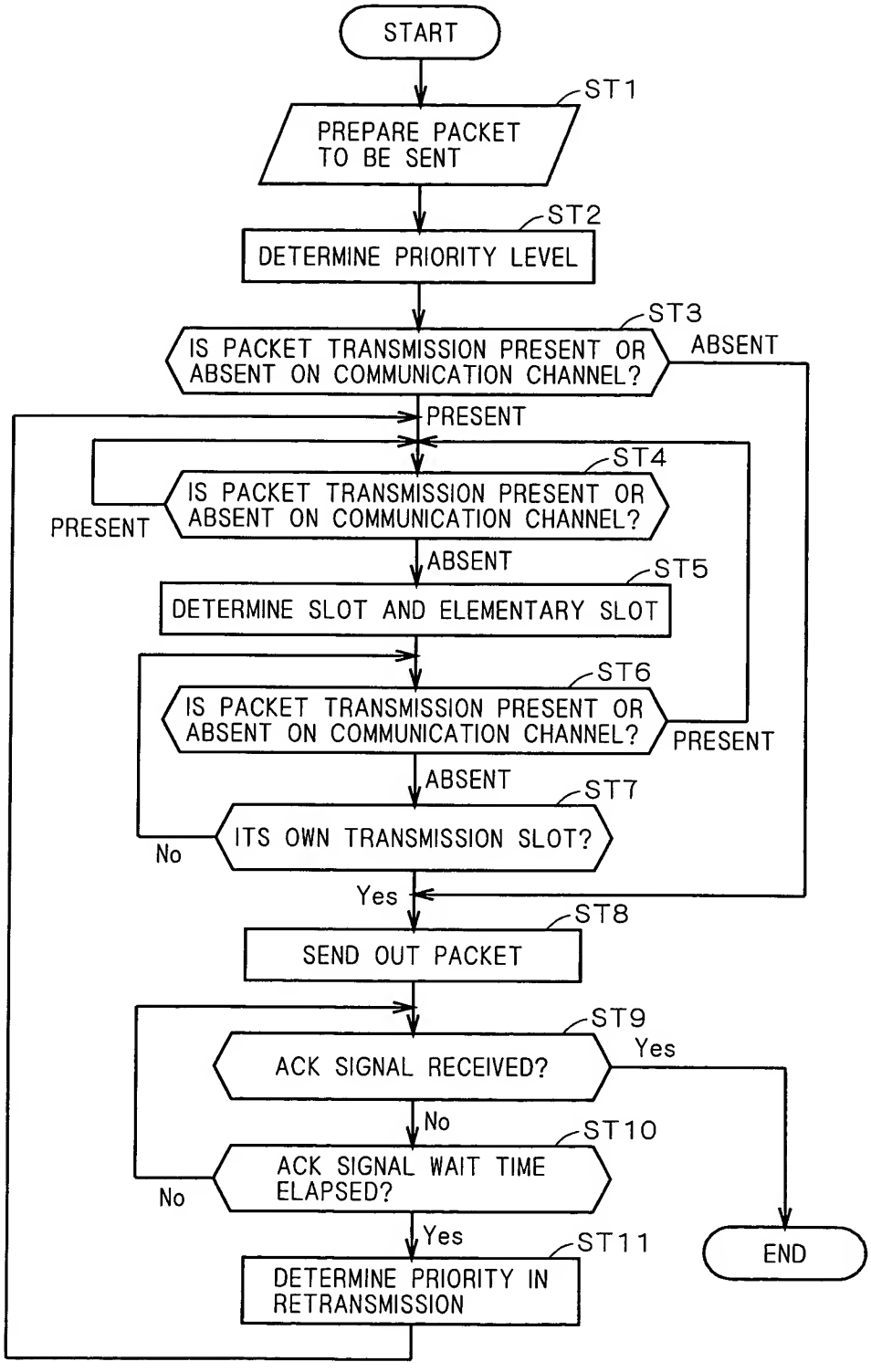

START
ST1
PREPARE PACKET TO BE SENT
ST2
DETERMINE PRIORITY LEVEL
ST3
IS PACKET TRANSMISSION PRESENT OR ABSENT ON COMMUNICATION CHANNEL?
ABSENT
PRESENT
ST4
IS PACKET TRANSMISSION PRESENT OR ABSENT ON COMMUNICATION CHANNEL?
PRESENT
ABSENT
ST5
DETERMINE SLOT AND ELEMENTARY SLOT
ST6
IS PACKET TRANSMISSION PRESENT OR ABSENT ON COMMUNICATION CHANNEL?
PRESENT
ABSENT
ST7
ITS OWN TRANSMISSION SLOT?
No
Yes
ST8
SEND OUT PACKET
ST9
ACK SIGNAL RECEIVED?
Yes
No
ST10
ACK SIGNAL WAIT TIME ELAPSED?
No
Yes
ST11
DETERMINE PRIORITY IN RETRANSMISSION
END

FIG. 7

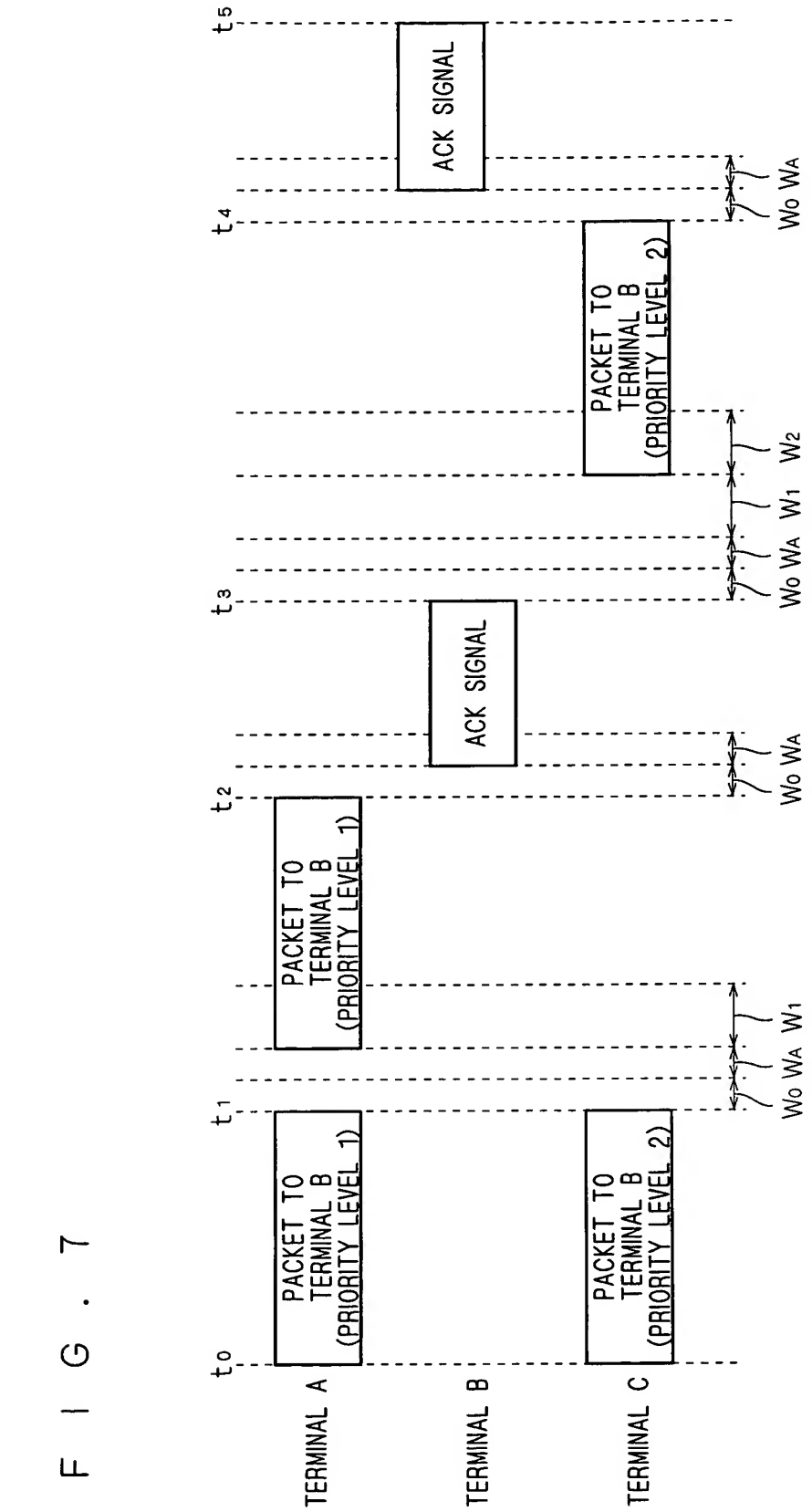

TERMINAL A
TERMINAL B
TERMINAL C
t0
t1
t2
t3
t4
t5
PACKET TO TERMINAL B (PRIORITY LEVEL 1)
PACKET TO TERMINAL B (PRIORITY LEVEL 2)
ACK SIGNAL
ACK SIGNAL
PACKET TO TERMINAL B (PRIORITY LEVEL 1)
PACKET TO TERMINAL B (PRIORITY LEVEL 2)
W0 WA W1
W0 WA
W0 WA W1 W2
W0 WA

FIG. 8

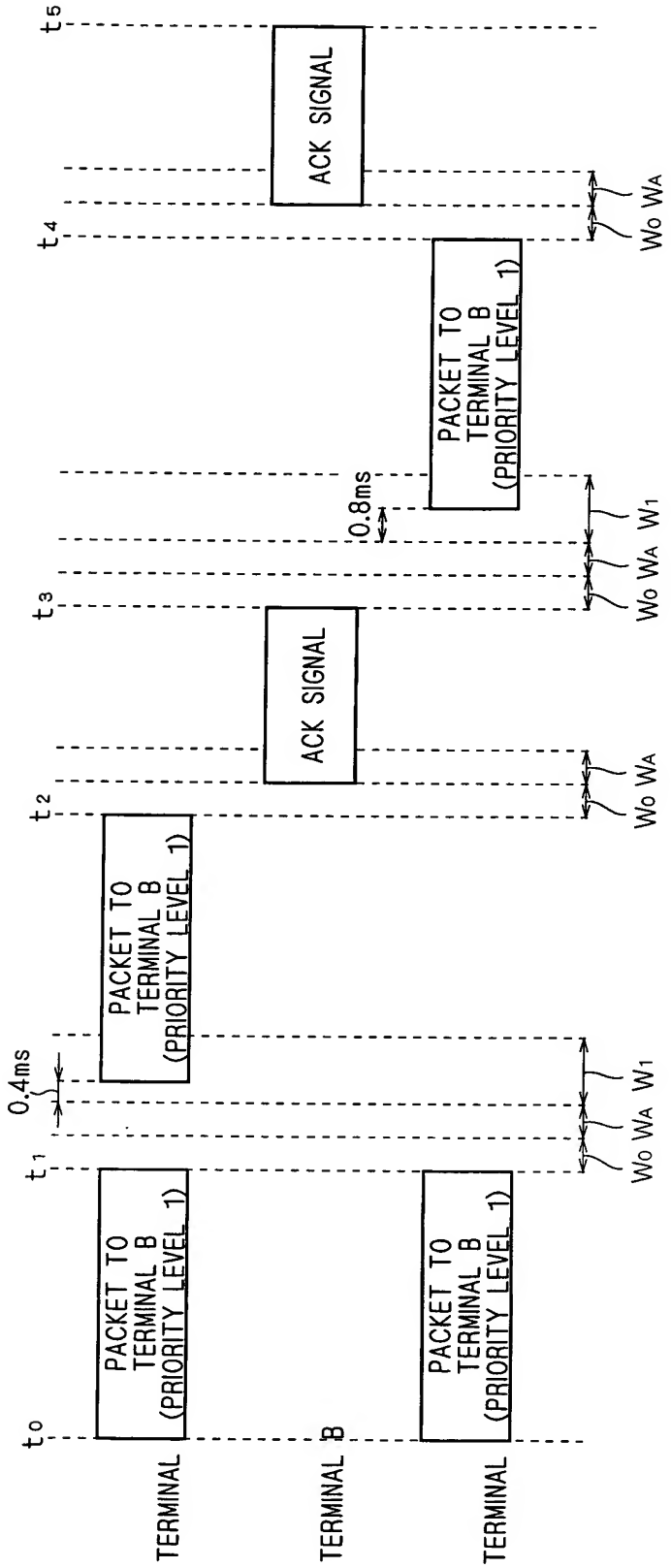

TERMINAL A
TERMINAL B
TERMINAL C
t0
t1
t2
t3
t4
t5
PACKET TO TERMINAL B (PRIORITY LEVEL 1)
ACK SIGNAL
0.4ms
0.8ms
Wo WA W1
Wo WA

FIG. 9

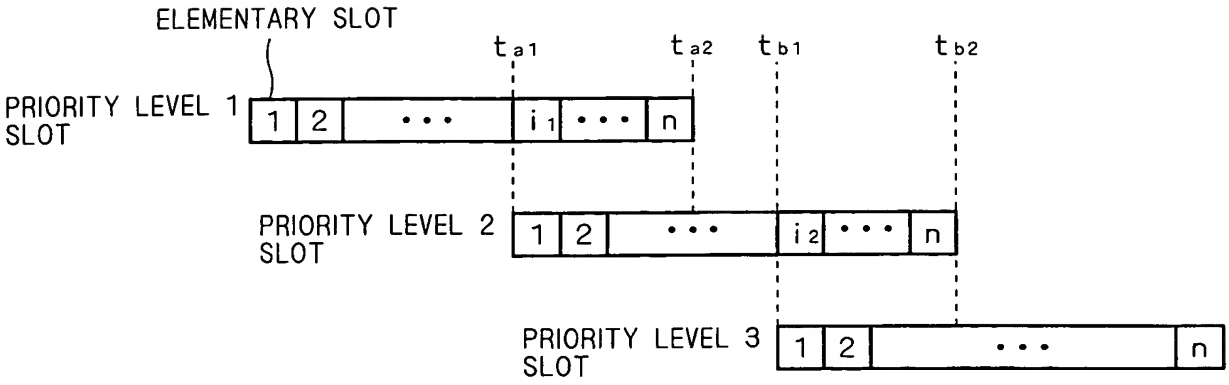

ELEMENTARY SLOT
t_{a1}
t_{a2}
t_{b1}
t_{b2}
PRIORITY LEVEL 1 SLOT
1
2
• • •
i_1
• • •
n
PRIORITY LEVEL 2 SLOT
1
2
• • •
i_2
• • •
n
PRIORITY LEVEL 3 SLOT
1
2
• • •
n

FIG. 10

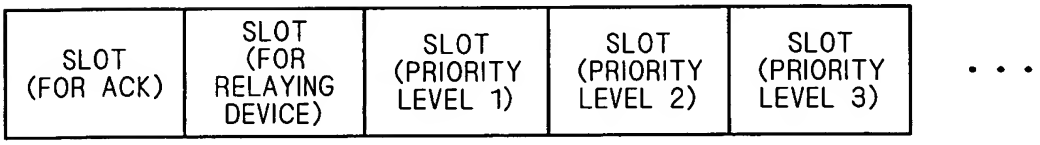

SLOT (FOR ACK)
SLOT (FOR RELAYING DEVICE)
SLOT (PRIORITY LEVEL 1)
SLOT (PRIORITY LEVEL 2)
SLOT (PRIORITY LEVEL 3)
• • •

FIG. 11A

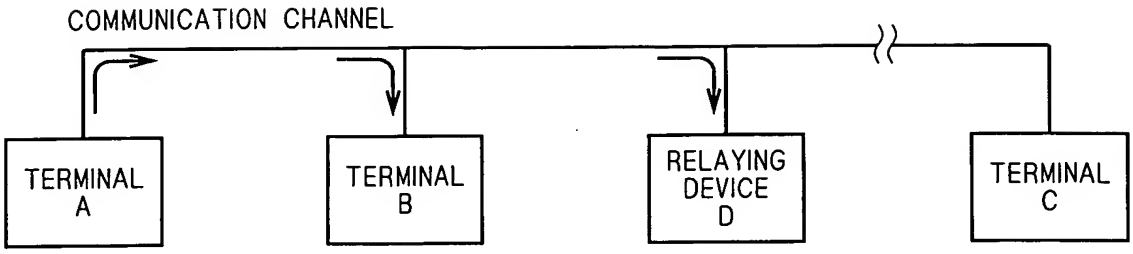


FIG. 11B

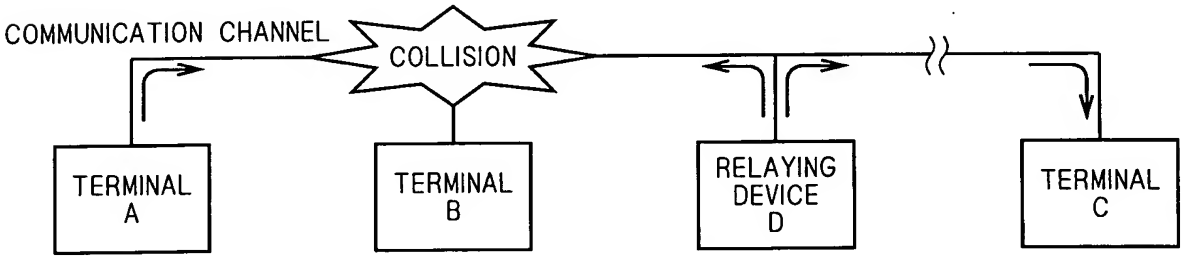


FIG. 12

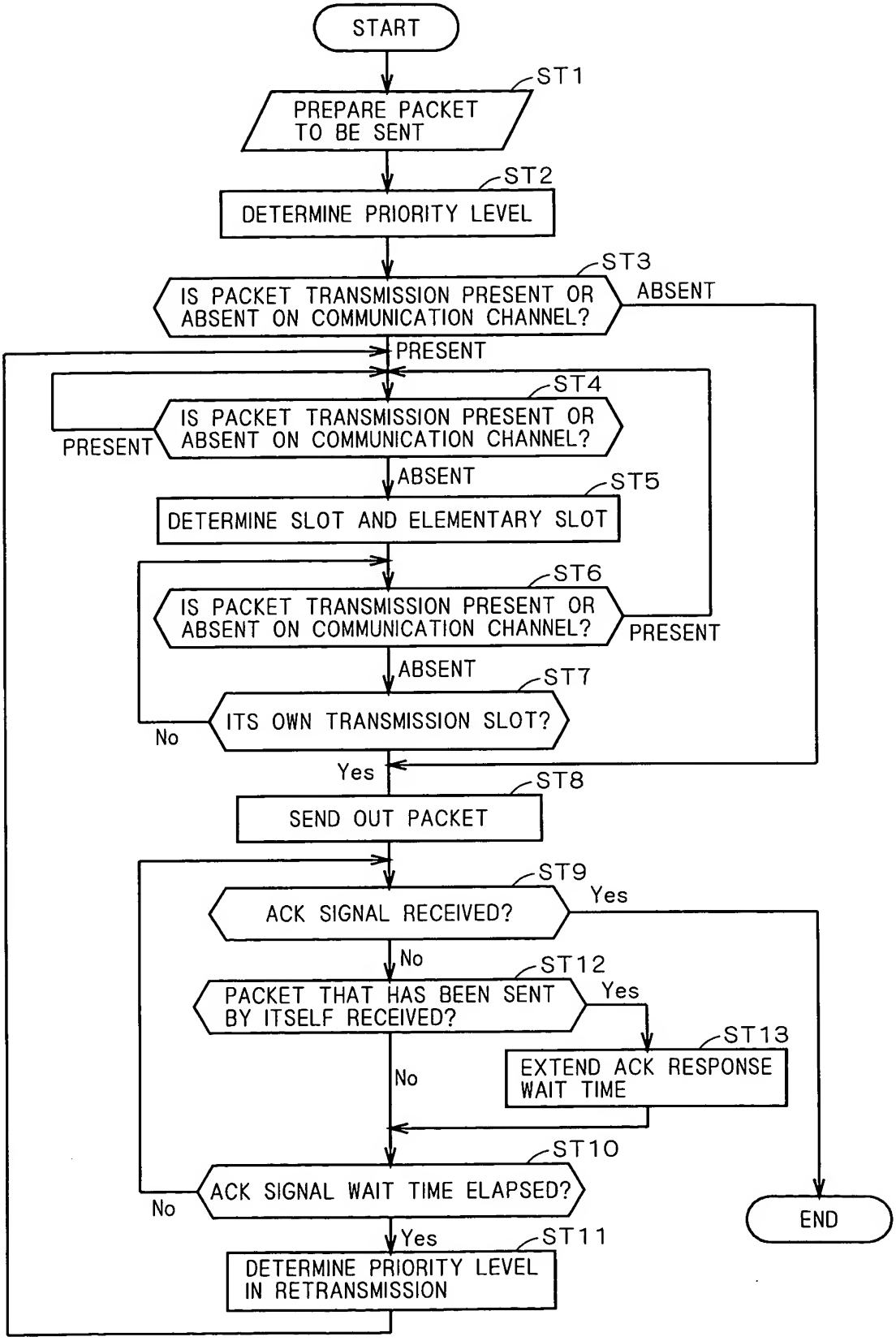

START
ST1
PREPARE PACKET TO BE SENT
ST2
DETERMINE PRIORITY LEVEL
ST3
IS PACKET TRANSMISSION PRESENT OR ABSENT ON COMMUNICATION CHANNEL?
ABSENT
PRESENT
ST4
IS PACKET TRANSMISSION PRESENT OR ABSENT ON COMMUNICATION CHANNEL?
PRESENT
ABSENT
ST5
DETERMINE SLOT AND ELEMENTARY SLOT
ST6
IS PACKET TRANSMISSION PRESENT OR ABSENT ON COMMUNICATION CHANNEL?
PRESENT
ABSENT
ST7
ITS OWN TRANSMISSION SLOT?
No
Yes
ST8
SEND OUT PACKET
ST9
ACK SIGNAL RECEIVED?
Yes
No
ST12
PACKET THAT HAS BEEN SENT BY ITSELF RECEIVED?
Yes
ST13
EXTEND ACK RESPONSE WAIT TIME
No
ST10
ACK SIGNAL WAIT TIME ELAPSED?
No
Yes
ST11
DETERMINE PRIORITY LEVEL IN RETRANSMISSION
END

FIG. 13

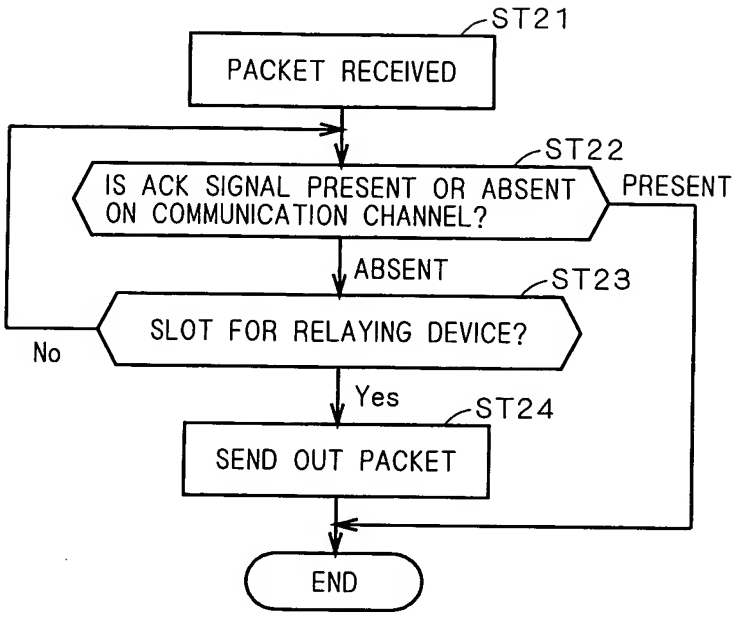

ST21
PACKET RECEIVED
ST22
IS ACK SIGNAL PRESENT OR ABSENT ON COMMUNICATION CHANNEL?
PRESENT
ABSENT
ST23
SLOT FOR RELAYING DEVICE?
No
Yes
ST24
SEND OUT PACKET
END

FIG. 14

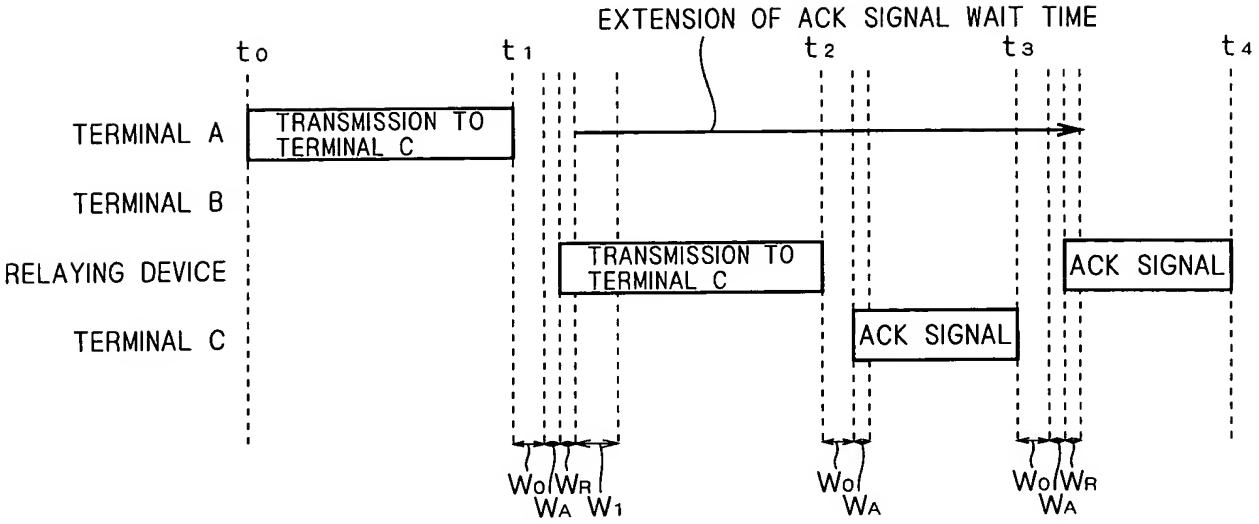
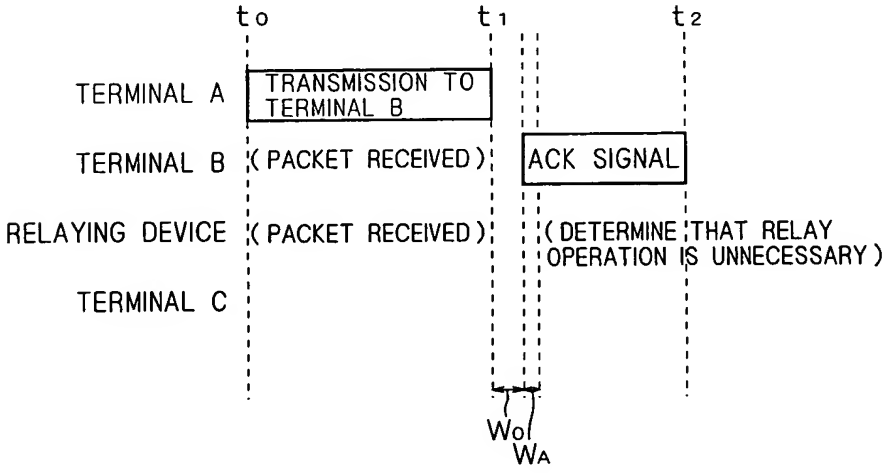

EXTENSION OF ACK SIGNAL WAIT TIME
t0
t1
t2
t3
t4
TERMINAL A
TERMINAL B
RELAYING DEVICE
TERMINAL C
TRANSMISSION TO TERMINAL C
TRANSMISSION TO TERMINAL C
ACK SIGNAL
ACK SIGNAL
WO
WA
WR
W1
WO
WA
WO
WA
WR

FIG. 15


t0
t1
t2
TERMINAL A
TERMINAL B
RELAYING DEVICE
TERMINAL C
TRANSMISSION TO TERMINAL B
(PACKET RECEIVED)
ACK SIGNAL
(PACKET RECEIVED)
(DETERMINE THAT RELAY OPERATION IS UNNECESSARY)
WO
WA